



Ø BEAT



COLO. SPRINGS,
COLORADO

NOVEMBER 1982

This Is Just The Beginning . . .

This article was written for Zero Beat by Joseph Steinocher. Mr. Steinocher has served as a Manufacturing Engineer for Rockwell Collins and Martin Marietta. He is currently Lead Production Engineer at Harris Semiconductor, Government Information Systems, Melbourne, Florida.

A BRIGHT TOMORROW — AN OVERVIEW

Using general terms like advancement, progress and 3rd generation are all weak when trying to describe the phenomenal development of the field of electronics. From vacuum tubes and ENIAC to Integrated Circuits and 32 bit microprocessors, all in a span of only 40 years is indeed phenomenal. What do the next forty years hold for us?

It has been said that if the aerospace industry had proceeded at the same pace as the electronics industry this galaxy would have been completely visited and mapped by now. For those who may be a little skeptical, this article will present a brief overview of electronics from its humble beginnings to its limitless future.

In the computer industry, the first "electronic brain" was introduced in the mid 1940's, required a whole room full of hardware (vacuum tubes), and was less efficient than today's five function with memory \$6.99 calculator. A large quantum jump was made when transistors developed in the early sixties contributed directly to mankind's successful efforts to reach outer space. NASA's continuing requirement of making it smaller, denser and more power efficient forced transistors to be added together on a chip only a few at a time at first, then more (5,000), then more (20,000), then MORE (100,000) all in an area measured .250" x .250". 5,000 transistors on a chip is roughly equivalent to a calculator chip, 20,000 transistors to a microcomputer and 100,000 is equivalent to a mainframe of a few years ago.

Now lets back up a little bit (pun intended) and explain a few of these terms thrown at you. Very simply described, all computers work on the principle of an electronic switch which when turned on is called a "1" and when switched off, a "0". This one/zero system is the basis of the boolean logic system and the base counting system called binary. Either the zero or the one is a bit, 4 bits (is not 50¢) is a nibble and 8 bits (not a buck) is a byte (pronounced bite). A CPU is a central processing unit (that's where the action is!) 8 bit CPU's have been around for a number of years now but new entrants into the field . . . 16 bit and 32 bit CPU's make the old 8 bit seem rather blasé after such exotic devices. The purpose for using 16 bit and 32 bit CPU's permit greater accuracy in calculation with less programming skills and also permits more information to be processed by the CPU in the same amount of time (they are faster!) And instruction giving in some cases (this will be covered in later articles).

But this incredible achievement has been due to micro miniturization making circuit traces and components so small that it becomes necessary to view individual circuit lines beneath the electron microscope. And it is with a modified electron microscope that traces as small as .5 microns (1/2,000,000 of a meter or 0.00001969") are presently being developed. That small a circuit trace is under development for the latest wave of chips (Integrated Circuits) called VHSIC (Very High Speed Integrated Circuits). In the chip industry it is generally understood that the difference between chips is as follows:

Small Scale Integration (SSI)

3 to 30 gates per chip

Medium Scale Integration (MSI)

30 to 300 gates per chip

Large Scale Integration (LSI)

300 to 3,000 gates per chip

continued on page 3

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The Pikes Peak Radio Amateur Association meets on the second Wednesday of every month at the First United Methodist Church, 420 N. Nevada, at 7:30 p.m. All amateurs and interested parties are invited to attend.

Editor: Don Lohse KBØKQ, 1410 E. LaSalle, Colorado Springs, CO 80907 635-7469

OCTOBER MEETING MINUTES

The October meeting of the Pikes Peak Radio Amateur Association was called to order at 7:38 PM by vice-president Karl White, K4DQ. After introductions were made by those in attendance, the minutes of the September meeting were accepted by voice vote.

The Treasurer's report was given by Doug, WBØMHP, who announced a balance of \$2032.

Additional announcements were made. Rosie, WAØMNL reported the passing of a local amateur, WØGBX.

Dave, NØDV, extended thanks from the Zero Beat editor for the September articles and announced it was not too late to enroll in the Novice Classes being given every Tuesday and Thursday at 7:30 PM in Rm. 107 of North Junior High.

The order of business for the October meeting was to nominate and elect officers and board members for the four expired terms on the board of directors for the club. The nominating committee placed the following names before the members.

For President, Karl White K4DQ; for Treasurer, Les Borst KCØNC; for Secretary, Mark Richardson KAØJXW; for Board Member, Joe Quintana KA8NPJ; Bill Lange W1THA; Jake Jacobs NØCYR; Larry Augenstein KAØNLI.

Additional nominations, requested from the floor, were as follows:

For President, Dave Vierling NØDV; for Vice-President, Charlie Biggs KCØTI; for Board Member, Greg Utterback KAØFOZ.

It was moved and carried that nominations be closed. It was additionally moved and carried that all unopposed candidates be acclaimed as elected.

The results of the voting for President were to elect Dave Vierling, NØDV. The board member elected was Jake Jacobs, NØCYR. The constituency of new board of directors is listed with an asterisk(*) to denote those elected by vote or acclamation to begin a 2-year term of office.

*President, Dave Vierling NØDV; *Vice-President, Charlie Biggs KCØTI; *Treasurer, Les Borst KCØNC;

Secretary, Mark Richardson KAØJXW; Board Members, Tom Weatherly ADØO, Karl White K4DQ, Bud Leibengud NØDDF; *Jake Jacobs NØCYR.

The meeting was adjourned at 9:20 PM.

Respectfully submitted,
Greg, KAØFOZ

MEETING NOTICE

The November meeting of the Pikes Peak Radio Amateur Association will be held on November 10 at 7:30 p.m. at the First United Methodist Church located at the corner of Nevada and Boulder streets. The program will consist of a movie from the ARRL and a presentation by Ray Uberecken on some of the myths and misconceptions about antennas and their associated equipment. All members and interested persons are invited to attend.

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Technology (cont.)

Very Large Scale Integration (VLSI)

3,000 to 30,000 gates per chip

Very High Speed Integrated Circuit (VHSIC)

30,000 to 100,000 gates per chip

— where a gate (AND, OR, NAND, NOR) (from boolean algebra, directly related to digital logic) consists of one transistor. Actual chips should be ready for sale (\$\$\$\$ VERY EXPENSIVE \$\$\$) near the end of this decade. If you ask "why so far away?" It is because of the requirement to create new technology for manufacturing in quantities and software (computer programs) to generate CAD (Computer Aided Design) of circuitry and architecture of the new chips.

Along with the tremendous advancements in CPU technology equally amazing advancements have occurred in peripheral devices. A peripheral is considered any device that is not a CPU or mainframe memory. Consequently floppy disc, mini-floppy disc, hard discs, printers, plotters, digitizers, keyboards, CRT's, and optical scanning devices can be considered peripherals. Optical storing devices in peripherals seem to be the next promising wave of technology. These devices will be able to store in excess of a Gigabyte (one billion bytes or 10^9). This type of storage is equivalent to 15,260 standard 64K byte memories hooked together (64K bytes is the present amount of memory offered by most popular personal computers and is usually considered more than sufficient). Of course size is not the only aspect of modern electronics that is noteworthy. Access time (speed of use) has altered greatly. An instruction cycle requires $1/10,000,000$ of a second, (that is the time required to do the instruction). That is an improvement of 2,000 times the speed of computer several decades ago.

With related information processing industries increasing in size and quantity, the future will bring a vast array of super computers on a chip. Cottage industries (home industries) may once again flourish since these related industries do not require major

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plants, massive organizational structures, inventory or capital equipment. Instead, they require knowledge, creativity, small investment and a reasonable boss (yourself!) and a good work force (also you!!) Look for information handling to become a major industry. The collection, correlation and continuous updating of information will cause a boom in usable knowledge that will make comparable advancements of the last 200 years in months. Access will explode to vast repositories of knowledge (Library of Congress, University Libraries, Masters and PhD theses, latest copyrights, marketing of inventions, prior to manufacturing, etc., etc.) The cycle will be complete when these advancements will feed back into the computer industry creating CPU chips with line widths measured in Angstrom units.

Along with some crystal ball gazing it seems that some new advances have characteristics that make them natural for key roles in leading technology. The Josephson's junction is sure to be just such a case, its inventor found the electrons flow through certain materials much faster than expected when the ambient temperature of those materials is close to absolute zero. Cryogenic equipment is required to bring the materials down to their superconducting condition. With a hairlike crack between them it then induces either a current or a voltage and high frequency radiation. Cryogenic equipment is expensive and complex, and absolute zero has not been reached, but a little over 500 miles away exists the perfect environment for this superfast device. It's called space! That perfect vacuum that is close to absolute zero. Of course, protection from radiation and heat of the sun must be provided, but where sunshine is blocked becomes very cold and close to absolute zero. Consequently we have just described the best device to go into space that requires no special environment carried up from our precious planet; one that survives and even thrives on that merciless

Technology (cont.)

environment of space. Since this device also emits a radiation frequency when voltage jumps the gap it can be modified to be communications device.

Having covered (more like barely touched on) many different topics and just grazed the surface, you are fully qualified to be dangerous. But if this information tickles your curiosity step a little closer and follow the articles which are currently being run in Zero Beat which will explain the intricacies of microcomputers (not anywhere as difficult as it sounds) and join the future. Once you have started, your contribution will move us all closer to that bright tomorrow.

Estate Auction

'Butch' Clare Schisler, WØGBX, of Colorado Springs passed away recently. He had been a Ham more than 65 years.

His radio equipment is being sold along with household and garage type items. There will be an auction at his residence 1415 South Tejon, Colorado Springs on November 20, 1982 at 10:00 a.m. There will be a household item sale also beginning at 8:00 a.m. The sales will be held indoors — doors open 8:00 a.m.

Tools, electronic items, automotive parts, antennas, Swan 400 with power supply, Heathkit SB 101, SB 630 clock identifier, phone patch, linear amplifier, CQ's, QST's, must be 1,000 tubes.

Aluminum irrigation pipe (20' ling), meters, antique radio and household items . . . You have to see it to believe this sale.

Lunch will be available along with coffee, rolls and soft drinks. There is parking in the lot across alley from garage in back of house.

WØMNL, Rosie Lewis, Coordinator 632-5721
WØVI, Pete Demario, Auctioneer
WØNTA, Ida DeMario, Clerk

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Amateur Radio Aboard Shuttle

Astronaut Dr. Owen Garriott W5LFL has been granted tentative approval to operate 2 meter fm from the space shuttle Columbia during the October 1983 mission. The operation will be limited to the lower 2 MHz of the 2 meter band to avoid pileups on U.S. and Canadian repeaters, and to make it a world wide good will mission.

Exact frequencies and methods of avoiding "20 meter type" operations are being studied and will be announced later. The rig to be used will be a low power one constructed in the ARRL lab to meet NASA's rig specifications.

TNX to Harry WØRTB and WESTLINK REPORT

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 Icom 255A w/TTM \$225.
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 Yaesu Landliner phone patch \$50.
 Yaesu FRG 7 Rcvr. w/Gilfer and filter mods. Mint condition \$275.
 Heath SB 201 amp. w/o 10m. Perfect condition \$325.
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 ARRL Publications & Bash books

BOARD MINUTES

The meeting of the newly elected Board of Directors of the Pikes Peak Radio Amateur Association was called to order October 18th, 1982 at 7:43 PM in the home of Karl K4DQ. Members present were Dave NØDV; Charlie KCØTI; Les KCØNC; Mark KAØJXW; Karl K4DQ; Bud NØDDF; Tom ADØO; Jake NØCYR; and Doug WBØMHP. The business following was presented.

The Christmas party is tentatively set for December 3rd at the Flying W Ranch. Cost of food and entertainment will be \$12.00 per person and will be paid in advance. A cash bar is also available. More information will be sent to club members as plans are finalized.

Use of the generator was requested by Ray and Greg. Since it was needed immediately, approval was granted. Discussion centered on the need for a policy governing generator use. Until a formal policy is adopted, requests for use will be considered on a case by case basis. Total cost of the generator was \$495.15 representing a reduction of about 50% off the list price.

Vice-Presidential duties were outlined for Charlie who is newly elected.

Karl submitted a letter from Cablevision listing fines this past year. Some discussion followed.

Future meetings were considered: November, film night; December — Homebrew; February — computers (?); March — Chuck Hill (?). The Board wondered if anyone was available to give a presentation on slow-scan television.

Possible sites for a club station were considered. Initial contacts will be made for negotiating.

A list of standing committees will be submitted to Zero Beat in the near future.

Jake moved to reaffirm the club having two different board members able to sign checks for the club. Tom seconded and motion passed unanimously.

There being no further business before the board, the meeting adjourned at 9:56 PM. The next meeting will be November 15th at Bud's home — NØDDF.

Respectfully Submitted,
 Mark Richardson, KAØJXW

Cable Company Fined

A California cable company has been fined \$6,000 for failure to clear up leakage and interference problems. The FCC took the action against Sonic Cable TV. The fine was for two violations, failure to comply with government regulations concerning leakage, and for interfering with amateur operations in the 145 MHz range.

TNX to Harry WØRTB and WESTLINK REPORT

Something Missing?

Due to a huge lack of time on the part of the author, the next article in our series on computers will not appear this month. Look for it in the December issue.

Federal Judge Rules Antenna Height is Federal Domain

On June 25 of this year, U.S. District Judge David L. Russell ruled that amateur radio antenna heights lie within federal jurisdiction.

The ruling came in a case concerning the city of Oklahoma City versus N55W Charles Guschke. Guschke had erected a 78 foot antenna even though the residential height limit was 35 feet. An attempt to get a variance was made, but turned down due to "intense neighborhood interest".

In his ruling, the judge said that amateur operation is usually incidental to residential property use, and further said that since amateur operation is a federally licensed use, and antenna height is necessary for that use, then the plaintiff's (Guschke) rights and federal law are in conflict with the municipal law. The ARRL filed a friend of the court brief in the case, and stated that

"radio transmissions, equipment and operation has been recognized by the U.S. Supreme Court to lie within the federal domain."

"This decision is in addition to a earlier California decision which held that height restrictions violate an amateur's freedom of speech."

This emerging legal trend bears watching by all amateurs interested in antenna height restrictions.

FCC Rules On Simplex Repeater Conflict

In September, the FCC ruled that due to the nature of repeaters, their use by a number of amateurs, and the use of national band plans that simplex interference with repeater operation is a violation of Section 97.78 (the good amateur practice rule) and that offenders are liable for Notices of Violation. The commission noted that over 1 MHz of space are for other than repeater use.



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